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CONTENTS

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A NEW CORYBAS SPECIES FROM SOUTH AUSTRALIA

by

D. L. JONES* AND R. C. NASH†

ABSTRACT

A new species of *Corybas* (Orchidaceae) from South Australia is described and illustrated. The new taxon has affinities with both *C. diemenicus* (Lindl.) H.M.R. Rupp and *C. dilatatus* (H.M.R. Rupp and W. H. Nicholls) H.M.R. Rupp. A table setting out the contrasting characters between these three species is provided.

Corybas despectans D. L. Jones and R. C. Nash, spec. nov.

ex affinitate *C. dilatati* et *C. diemenici*, sed a priore differt tubo labelli laminam aequanti et a secundo marginibus labelli expansis (nunquam incurvatis) distinguitur; a his ambobus recedit sic—sepalo dorsali nec late spathulato nec cucullato, callo labelli costis parallelibus depressis praedito (nec integro nec dentibus brevibus scabridis instructo) atque auriculis in tubo labelli inconspicuis (foramen minutum facientibus).

HOLOTYPE: Lower Coorong, South Australia. *R. C. Nash*, 8.viii.1967 (AD 96815018).

ISOTYPES: AD, Herb. Nash 308.

PARATYPE: Yorke Peninsula, Marion Bay Rd., ± 25 miles south of Warooka, in Mallee scrub. *R. C. Nash*, 16.viii.1967 (AD 96815021).

Leaf 8–25 x 12–30 mm, cordate to orbicular, occasionally lobed, apiculate, green on both surfaces. *Flower* 7–12 mm long, reddish-purple, dominated by the lamina of the labellum, sessile or almost so. *Ovary* 3–5 mm long, narrow, subtended by a small narrow bract. *Dorsal* sepal 6–11 x 3–4 mm when flattened out, greenish-grey with some purple striations, spathulate-oblong, concave, carinate, erect in the lower half then curving gently through about 60°, the apex acute or obtuse, often irregularly notched. *Petals* about 2·0 x 0·8 mm, slightly falcate, winged

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Muelleria 3 (3): 165–168 (1976)

5970/76.

at the base where they join the column, then tapering to filiform points, often notched. *Lateral* sepals about 5 x 0·8 mm narrow acute, connate at base, tapered from base to extremity, apex entire. *Labellum* longer than dorsal sepal; labellum-tube 4–5 mm long about equal in length to the lamina, erect for about 4 mm then abruptly decurved through 180° and greatly expanded into an almost circular lamina; lamina 7–8 x 9–11 mm reddish with conspicuous venation, its margins slightly denticulate; boss flat, almost triangular inconspicuous; callus consisting of about four raised divergent plates, occasionally adorned with minute teeth. *Auricles* extremely small directed downward with a minute opening hidden by the base of the lateral petals. *Column* about 2·5 mm long, narrow, of nearly equal width throughout, minutely winged. *Stigma* ± 1·5 mm in diam., ± rectangular concave. *Anther* 1–1·5 mm long, entire. *Pollinarium* 1·0 x 0·8 mm, consisting of 4 pollinia in two pairs, attached directly to a reniform viscidium 0·5 mm long. *Pollinia* mealy.

Specimens Examined: Lower Coorong. R. C. Nash, 23.viii.1969; Lower Coorong. *R. C. Nash*, 7.viii.1971 (Herb. Nash 990); Yorke Peninsula, Sand hills behind Pondalovic Bay. *R. C. Nash*, 16.viii.1967 (AD 96815003); Yorke Peninsula, ± 1 mile east of Corny Point Store. *R. C. Nash*, 16.viii.1967 (AD 96815022) (Herb. Nash 243); ± 2 miles south of Meningie, east of Highway one, in Mallee scrub. *R. C. Nash*, 7.viii.1971 (AD 97137075) (Herb. Nash 979); Eyre Peninsula, Hundred Uley, block 1. *D. J. E. Whibley*, 24.viii.1967; (AD 97336001); Eyre Peninsula, Yangie Bay. *C. R. Alcock*, 25.ix.1966. Plants with seed capsules (AD 96718113); Eyre Peninsula, Hundred Sleaford, Fisheries Bay. *C. R. Alcock*, 5.ix.1965. Plants with seed capsules (AD 966011055); Eyre Peninsula, Hundred Uley, Section 14. *Hj. Eichler*, 24.viii.1967 (AD 96742084); Sellicks Beach in the Aldinga Scrub. *T. J. Smith*, 18.viii.1967 (AD 97016039); west of Cherry Gardens. *R. C. Nash*, 23.viii.1967; Eyre Peninsula, Koppio. *M. J. Clark*, 1967; near Naracoorte. *M. J. Beek*, 9.viii.1968.

Flowering Period: July–August.

Distribution: At present known from south-eastern and southern South Australia in low Mallee or open eucalypt forest under bracken. An extension into Victoria is to be anticipated as it occurs very close to the border.

Discussion: The distinctiveness of this orchid was first recognized by Mrs. M. J. Beek of Naracoorte, who found it at Desert Camp, South Australia in 1966. Field trips and examination of specimens in the State Herbarium have shown it to be a fairly widespread species. It has been found growing close to the sea or inland with the habitat varying from light sandy soil in low Mallee to eucalypt forest (often over limestone). In common with most *Corybas* species it grows in large colonies.

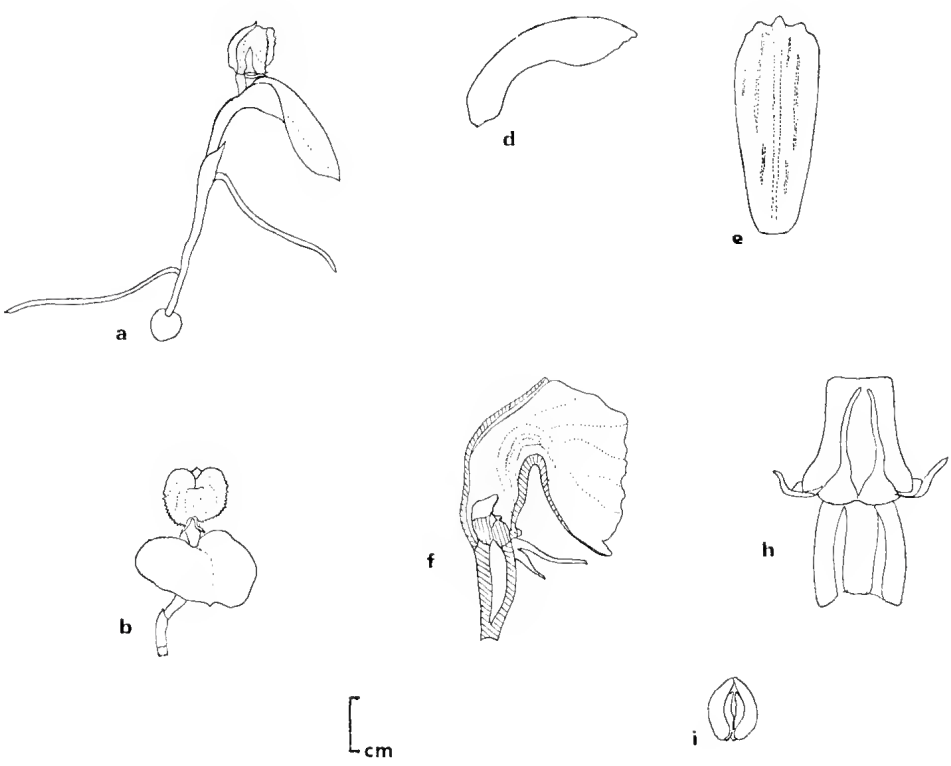

Fig. 1.—a–flowering plant from side, to indicated scale; b–flowering plant from front, to indicated scale; c–labellum from front, to scale x 3; d–dorsal sepal from side, to scale x 4; e–dorsal sepal flattened out, to scale x 4; f–longitudinal section of flower, to scale x 4; g–column and lateral sepals from side, to scale x 5; h–base of labellum tube showing auricles, lateral sepals and lateral petals from front, to scale x 8; i–polinarium, to scale x 10; j–column, lateral sepals and lateral petals from front, to scale x 5.

5970/76.—2

Corybas despectans has affinities with both *C. diemenicus* and *C. dilatatus* however it can be readily distinguished from both by the small flower and very short non cucullate dorsal sepal. Further differences are listed in Table 1.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the help of the staff of the State Herbarium of South Australia, in particular Mr. J. Weber. We also thank Mrs. M. J. Beek for specimens and information and Dr. J. H. Willis for the Latin description.

Corybas dilatatus	*Corybas diemenicus*	*Corybas despectans*
Dorsal sepal broadly spathulate, cucullate	Dorsal sepal broadly spathulate, cucullate	Dorsal sepal narrow-spathulate to oblong, non-cucullate
Labellum-tube longer than lamina	Labellum-tube equal to lamina	Labellum-tube equal to lamina
Labellum margins spreading, denticulate	Labellum margins incurved denticulate	Labellum margins spreading, slightly denticulate
Labellum callus entire ..	Labellum callus of short scabrid teeth	Labellum callus of parallel flattened ridges
Labellum auricles conspicuous, widely opening	Labellum auricles conspicuous, widely opening	Labellum auricles inconconspicuous, minutely opening

Table 1.—Contrasting Characters.

AN ANALYSIS OF THE FLORA OF VICTORIA

by

J. H. Ross*

SUMMARY

The flora of Victoria is analysed and attention drawn to the high proportion of naturalized alien species. Diagrams illustrate the proportion of certain elements of the flora. Families with more than 0·5% of the total number of species in Victoria, and genera containing 15 or more species, are tabulated. The marked inverse relationship between numbers of genera and families is illustrated.

J. H. Willis's "Handbook to plants in Victoria" (1970, 1972) provide a convenient basis for an analysis of the flora. Several genera have been revised since the publication of Willis l.c. and these revisions, together with many new records for Victoria, have been taken into account in the analysis. There are now (Jan. 1976) 178 families, 918 genera and 3322 species of vascular plants, both indigenous and naturalized, recorded in Victoria. (Table 1).

	Families	Genera	Species
Pteridophyta	24	47	112 (1)
Gymnospermae	3 (1)	3 (1)	9 (3)
Angiospermae			
Monocotyledoneae	36 (5)	242 (66)	883 (181)
Dicotyledoneae	115 (14)	626 (201)	2318 (562)
Totals	178 (20)	918 (268)	3322 (747)

Table 1.—Proportional representation of Victorian Flora.

Figures in parentheses denote naturalized alien taxa. Thus, of the 178 families, 20 are represented by only naturalized species introduced to Victoria, 268 of the genera are also so limited, but the 747 naturalized species are divided between the 268 naturalized genera and genera which are represented by both native and introduced species.

Of the 178 families in Victoria, 24 (13·48%) are pteridophytes, 3 (1·69%) are gymnosperms, 36 (20·22%) are monocotyledons and 115 (64·61%) are dicotyledons (see Fig. 1.).

* National Herbarium of Victoria

Muelleria 3 (3): 169–176 (1976)

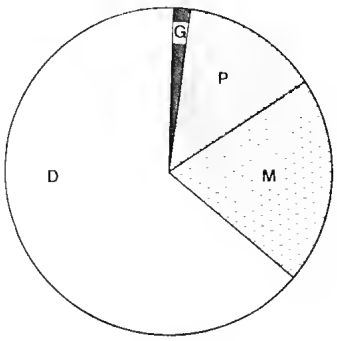

Fig. 1.—Proportional representation of gymnosperm, pteridophyte, monocotyledon and dicotyledon families in the Flora of Victoria. G = gymnosperms, P = pteridophytes, M = monocotyledons and D = dicotyledons.

The proportion of the Victorian flora is as follows:—

—	Number of families expressed as a percentage of the total		Number of genera expressed as a percentage of the total		Number of species expressed as a percentage of the total	
	Indigenous	Naturalized	Indigenous	Naturalized	Indigenous	Naturalized
Pteridophyta ..	13·48	0·00	5·12	0·00	3·34	0·03
Gymnospermae ..	1·12	0·56	0·22	0·11	0·18	0·09
Angiospermae ..	..	..	..	..	..	..
Monocotyledoneae	17·42	2·81	19·17	7·18	21·13	5·45
Dicotyledoneae ..	56·74	7·87	46·30	21·90	52·86	16·92
Totals ..	88·76	11·24	70·81	29·19	77·51	22·49

The present (Jan. 1976) total of 3322 species compares with the 3232 species recorded from Victoria in 1970 by Churchill and de Corona (1972 : 8). This increase of 90 species (includes new records, newly described species and newly naturalized species) during the last six years reflects a continuation of the rate of change in the Victorian flora noted by Churchill and de Corona during the forty years since the publication of Ewart's, Flora of Victoria (1931).

The naturalized aliens now (Jan. 1976) number 747 and form 22·49% of the total flora. Ewart, (1931 : 11), recorded that in 1909 there were 363 aliens and in 1928 there were 461, which represented an increase of "approximately one every 2 months or slightly more than five a year." Ewart noted that this rate of increase had been maintained with "remarkable uniformity during the past 60 years". The number of aliens recorded now represents an increase of 286 species during the 48 years since Ewart's calculations in 1928. This is an increase of almost six species per year during the past 48 years so the rate of increase has now been more or less uniform for over 100 years. Whereas the 461 aliens recorded by Ewart amounted to 17·60% of the

total flora, the 747 species now constitute 22·49% of the flora. Alien species are gradually forming an increasing percentage of the flora. Although the indigenous species outnumber the aliens by far, in many instances the distributions of the indigenous species are shrinking while those of the aliens are expanding. Some of the aliens, for example the pasture grasses, are valuable additions to the flora; others are noxious weeds.

Beadle, Evans and Carolin, Flora of the Sydney Region (1972:9), recorded that "the number of indigenous species is about 2000 and to this have been added almost 450 exotic species which have become naturalized . . . .". Thus the naturalized aliens in this area form about 22·50% of the flora which is

Family	No. of species	No. of species expressed as a percentage of the total	No. of genera	No. of genera expressed as a percentage of the total
Compositae	361	10·87	105	11·44
Gramineae	323	9·72	106	11·55
Papilionaceae	202	6·08	42	4·57
Orchidaceae	175	5·27	25	2·72
Cyperaceae	168	5·06	21	2·29
Myrtaceae	138	4·15	13	1·42
Chenopodiaceae ..	101	3·04	18	1·96
Mimosaceae	94	2·86	2	<0·5
Cruciferae	80	2·41	39	4·25
Proteaceae	66	1·99	10	1·09
Epacridaceae	60	1·81	15	1·63
Umbelliferae	57	1·72	24	2·61
Labiatae	51	1·54	19	2·07
Scrophulariaceae ..	51	1·54	19	2·07
Liliaceae	49	1·48	23	2·51
Rutaceae	49	1·48	10	1.09
Caryophyllaceae ..	48	1·44	20	2·18
Solanaceae	48	1·44	9	0·98
Rhamnaceae	47	1·41	6	0·65
Goodeniaceae	42	1·23	6	0·65
Rubiaceae	39	1·16	8	0·87
Juncaceae	37	1·11	2	<0·5
Ranunculaceae	34	1·05	5	0·54
Euphorbiaceae	33	0·99	13	1·42
Rosaceae	32	0·96	12	1·32
Polygonaceae	31	0·94	4	<0·5
Boraginaceae	29	0·87	12	1·32
Iridaceae	29	0·87	17	1·86
Malvaceae	27	0·81	10	1·09
Thymelaeaceae	24	0·72	2	<0·5
Geraniaceae	23	0·69	3	<0·5
Haloragaceae	23	0·69	3	<0·5
Amaranthaceae	21	0·66	3	<0·5
Dilleniaceae	21	0·66	1	<0·5
Myoporaceae	18	0·54	2	<0·5
Aizoaceae	17	0·51	10	1·09
Onagraceae	17	0·51	6	0·65
Santalaceae	17	0·51	6	0·65

Table 2.—Synopsis of the families whose species, both indigenous and naturalized, comprise more than 0·5% of the total number listed in order of numerical importance, together with the number of genera in each family.

similar to the percentage recorded from Victoria. The number of naturalized aliens recorded in the A.C.T. by Burbidge and Gray (1970 : 4) was 289 or 27·92% of the flora. On the other hand, Chippendale (1972 : 266) found that introduced species form only 4·17% of the flora of the Northern Territory.

Those families with more than 0·5% of the total number of species are listed in order of numerical importance in Table 2. The number of genera in these families is also reflected in Table 2 but, as family position is determined by the total number of species, the arrangement of genera follows no strict sequence.

Family	No. of indigenous species	No. of indigenous species expressed as a percentage of the total No. of species in the family	No. of naturalized alien species	No. of naturalized aliens expressed as a percentage of the total No. of species in the family
Compositae	268	74·24	93	25·76
Gramineae	198	61·30	125	38·70
Orchidaceae	175	100·00	0	0·00
Cyperaceae	159	94·64	9	5·36
Papilionaceae	142	70·30	60	29·70
Myrtaceae	137	99·28	1	0·72
Chenopodiaceae ..	91	90·10	10	9·90
Mimosaceae	89	94·68	5	5·32
Proteaceae	66	100·00	0	0·00
Epacridaceae	60	100·00	0	0·00
Rutaceae	49	100·00	0	0·00
Umbelliferae	48	84·21	9	15·79
Liliaceae	46	93·88	3	6·12
Rhamnaceae	46	97·87	1	2·13
Goodeniaceae	42	100·00	0	0·00
Cruciferae	40	50·00	40	50·00
Labiatae	35	68·63	16	31·37
Rubiaceae	32	82·05	7	17·95
Juncaceae	31	83·78	6	16·22
Scrophulariaceae ..	26	50·98	25	49·02
Ranunculaceae ..	25	73·53	9	26·47
Euphorbiaceae	24	72·73	9	27·27
Thymelaeaceae	24	100·00	0	0·00
Haloragaceae	22	95·65	1	4·35
Solanaceae	21	43·75	27	56·25
Dilleniaceae	21	100·00	0	0·00
Caryophyllaceae ..	19	39·58	29	60·42
Polygonaceae	19	61·29	12	38·71
Myoporaceae	18	100·00	0	0·00
Santalaceae	17	100·00	0	0·00
Malvaceae	16	59·26	11	40·74
Geraniaceae	13	56·52	10	43·48
Boraginaceae	12	41·38	17	58·62
Amaranthaceae ..	12	57·14	9	42.86
Onagraceae	12	70·59	5	29.41
Rosaceae	9	28·13	23	71.88
Iridaceae	9	31·03	20	68.97
Aizoaceae	9	52.94	8	47.06

Table 3.—Synopsis of the families with more than 0·5% of the total number of species showing the proportion of indigenous species to naturalized species within each family, the families listed in order of the numerical importance of the indigenous species.

The largest family is Compositae with 361 species (10·87%) followed by Gramineae with 323 species (9·72%) and Papilionaceae with 202 species (6·08%). These three largest families contribute 886 species or 26·67% of the total number of species, while the ten largest families contribute 1709 species or 51·45% of the total. Neither pteridophytes nor gymnosperms are represented amongst the families in Table 2.

The proportion of indigenous species to naturalized aliens in those families with more than 0·5% of the total number of species is shown in Table 3, the families being listed in order of the numerical importance of the indigenous species. When indigenous species alone are considered the sequence of families in Table 3 differs significantly from the sequence in Table 2. Compositae and Gramineae remain the largest and second largest families respectively but Papilionaceae slips from the third to the fifth largest. Several families, namely, Orchidaceae, Proteaceae, Epacridaceae, Rutaceae, Goodeniaceae, Thymelaeaceae, Dilleniaceae, Myoporaceae and Santalaceae are represented by only indigenous species, whilst more than half of the species in Rosaceae, Iridaceae, Caryophyllaceae, Boraginaceae and Solanaceae are naturalized aliens. Almost 72% of the Rosaceous species in Victoria are naturalized aliens.

Seventy-nine families (44·38%) are represented by only one genus, 36 families (20·23%) by two genera, 14 families by three genera, 8 families by four genera and 9 families by five genera. Only 32 (17·98%) of the 178 families have six or more genera each. The proportion of the families with six or fewer genera each is shown in Fig. 2.

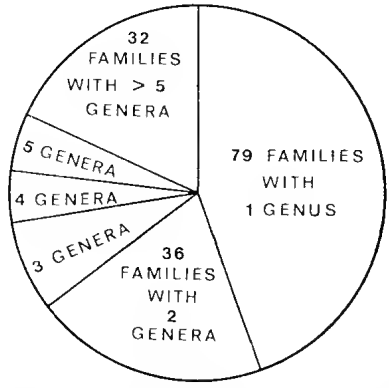

Fig. 2.—Proportional representation of families with six or fewer genera each.

Thirty-eight families (21·35%) are represented by only one species, 22 families (12·36%) by two species, 19 families (10·67%) by three species, 7 families by four species and 9 families by five species. Only 83 (46·63%) of the 178 families have six or more species each. The proportion of the families with six or fewer species each is shown in Fig. 3.

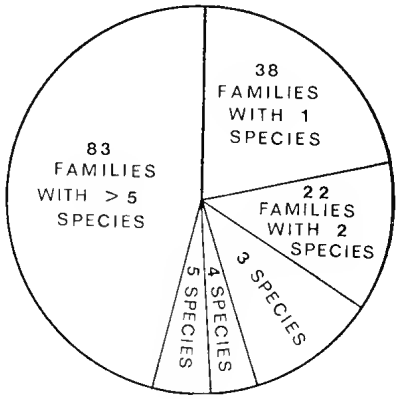

Fig. 3.—Proportional representation of families with six or fewer species each.

Wittsteinia F. Muell. and *Choristemon* H. B. Williamson, both of which are monotypic, are endemic in Victoria. *Choristemon* is a member of the Epacridaceae and *Wittsteinia* a member of Ericaceae although until recently it too was included in Epacridaceae.

The marked inverse relationship between the number of genera and families is shown in Fig. 4. Most families are seen to have few genera and only very few families have many genera. A similar inverse relationship exists between the number of species and genera. The ratio of genera to species in Victoria is 1 : 3·6187.

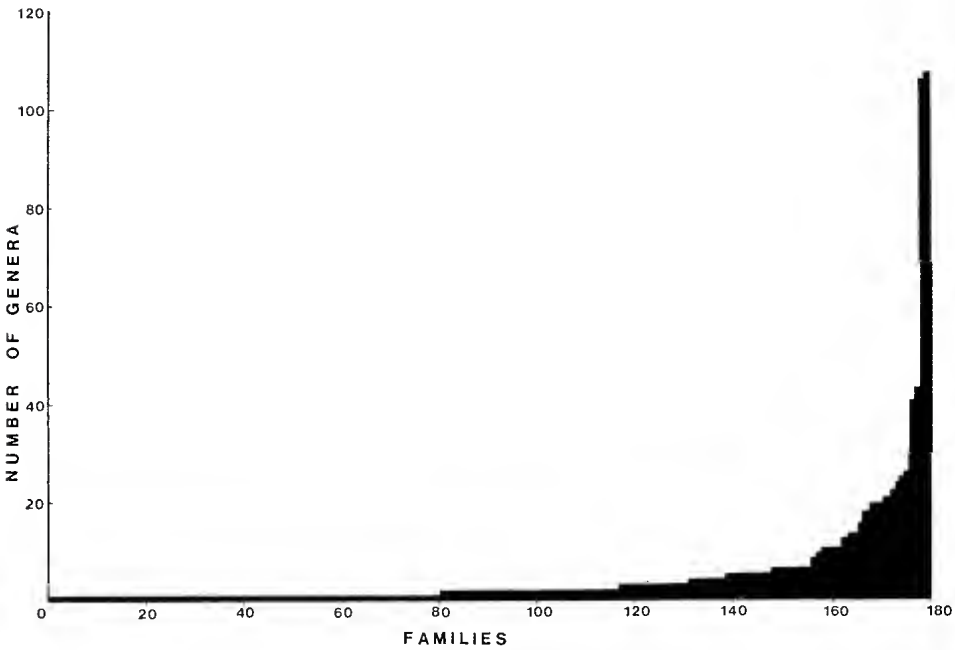

Fig. 4.—Histogram showing the marked inverse relationship between number of genera and families.

The genera with the largest number of species are listed in order of numerical importance in Table 4. Figures in parentheses indicate the number of naturalized aliens. If the naturalized aliens are excluded the relative positions of several genera are changed significantly and only 34 of the present 42 genera in Table 4 would still have fifteen or more species.

Although the Victorian flora is relatively well known, new species and new records are still being found. In addition, aliens continue to become naturalized and the naturalized species are

Genus	Number of species
Acacia	93 (4)
Eucalyptus	79 (1)
Pultenaea	47
Pterostylis	39
Olearia	37
Brachycome	34
Helichrysum	31
Pomaderris	31
Juncus	31 (6)
Carex	30 (4)
Prasophyllum	29
Scirpus	29 (3)
Ranunculus	28 (8)
Senecio	27 (4)
Grevillea	26
Leucopogon	26
Solanum	25 (13)
Thelymitra	24
Danthonia	24
Atriplex	24 (3)
Cyperus	24 (2)
Pimelea	23
Stipa	23 (1)
Caladenia	22
Goodenia	22
Hibbertia	21
Trifolium	20 (20)
Maireana	19
Lepidium	19 (5)
Poa	18 (4)
Deyeuxia	17
Lepidosperma	17
Hydrocotyle	16
Leptospermum	16
Schoenus	16
Plantago	16 (4)
Helipterum	15
Phebalium	15
Prostanthera	15
Chenopodium	15 (6)
Rubus	15 (11)
Veronica	15 (6)

Table 4.—Synopsis of the genera with 15 or more species listed in order of numerical importance.

forming an ever increasing percentage of the flora. It will be interesting to establish whether species continue to become naturalized at the same uniform rate that has prevailed during the previous hundred years.

ACKNOWLEDGEMENTS

Much of the information concerning the new records was gleaned from the records kept by Miss M. A. Todd. I am most grateful to Miss Todd for access to these records, and to Miss H. I. Aston for several informative discussions.

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HYPECOUM PENDULUM L. (PAPAVERACEAE) IN AUSTRALIA—A NEW INTRODUCTION

by

HELEN I. ASTON*

SUMMARY

The discovery of the introduced weed *Hypecoum pendulum* L. (sensu lato) at Lake Boga, Victoria, is described. This appears to be the first record of any species of *Hypecoum* naturalized in Australia. A taxonomic account of *Hypecoum pendulum* and closely related taxa is given.

OCCURRENCE

On 29 September 1970 *Hypecoum pendulum* L. (sensu lato) was collected by T. W. Donaldson from the property of E. R. Mitchell (allotment 10, section 2, parish of Kunat Kunat) approximately 2·5 km direct line west north west of the township of Lake Boga, in northern Victoria. Lake Boga is between Kerang and Swan Hill. The collection had flowers and early fruits, and the species was growing wild over several acres of a wheat crop. On 11 December 1970 W. J. Anderson collected material with ripe fruits from the same locality. Both collectors are officers of the Vermin and Noxious Weeds Destruction Board, Victorian Department of Crown Lands and Survey, and forwarded their collections (KTRS 222/70; KTRS 320/70) through the Keith Turnbull Research Station to the National Herbarium of Victoria for identification. Specimens are retained at MEL. This is apparently the first record of any species of *Hypecoum* naturalized in Australia.

The species was not noted in the district during 1971 and 1972, but in 1973 a second infestation of *Hypecoum* was found in a sandy, windblown, roadside area and adjacent cropland. This was approximately 4·5 km direct line west of Lake Boga Township along the Lake Boga to Goschen road and about 2·5 km west south west of the 1970 locality. Material gathered in 1973 from this second site was not retained at the National Herbarium. However, the species is persisting and further material (flowers and developing fruits 30 September and 1 October 1975; immature to mature fruits 19 November 1975) has been collected by W. J. Anderson from both sites. Specimens are lodged in the National Herbarium of Victoria, Melbourne; State Herbarium of South Australia, Adelaide; National Herbarium of New South Wales, Sydney; Herbarium Australiense, Canberra; Western Australian Herbarium, Perth.

* National Herbarium of Victoria.

Muelleria 3 (3): 177–182 (1976)

Hypecoum pendulum is native to the Mediterranean regions of southern Europe and northern Africa, and to south-west Asia (islands in the Mediterranean sea; Portugal; Spain; southern France; Italy; Jugoslavia; Greece; Bulgaria; Rumania; Turkey; Lebanon; north Arabian desert; Iran; Afghanistan; Pakistan; Southern Russia—regions of the Black and Caspian Seas north to about Stalingrad and from the Caspian Sea east to Tashkent, Lake Balkash and Altai; Morocco; Algeria; Tunisia; Tripoli; Egypt—mediterranean coast). In these regions it flowers from March or April to May or June, and is recorded from cultivated land, fallow fields, grazing lands, waste and weed-infested places, sandy and clayey-stony deserts and clayey, rocky or rarely sandy foothill slopes, often in arid or semi-arid areas.

Within the British Isles species of *Hypecoum* have occurred casually on a number of occasions, following accidental introduction of seed, but they have failed to naturalize themselves. For example Druce (1908) recorded three species including *H. pendulum* L. as being of casual occurrence but not completely established in Britain. These casual occurrences of *Hypecoum* spp. have apparently originated from seed present as impurities amongst imported crop seeds or crop screenings (Brewer, 1863, p. 313; Dunn, 1905, p. 10–11; Salisbury, 1964, p. 137–8).

The origin of *H. pendulum* in the Lake Boga district is unknown. Paddocks at the Mallee Research Station, Walpeup, which supplies wheat seed to the Lake Boga district, have been searched but the species has not been found there (the manager, pers. comm., 18 Dec. 1975). Its appearance on cultivated and on waste land in open country with a comparatively warm dry climate is consistent with the habitat and climatic preferences recorded in its native countries. The species could spread locally and also extend to other agricultural areas of south-eastern Australia.

TAXONOMIC NOTES

In Willis (1973) *Hypecoum* is placed in the monotypic family Hypecoaceae which is noted as "almost exactly intermediate between Papaveraceae (s. str.) and Fumariaceae." Current floras either accept this (Täckholm, 1974) or place the genus in Papaveraceae (Cullen, 1966) or in Papaveraceae subfamily Hypecoideae (Cullen, 1965; Maire, 1964; Howat and Tutin, 1964; Popov, 1937 transl. 1970). The genus consists of glabrous annual (rarely biennial) plants some 15-40 cm high and has distinctive flower and fruit characters—sepals 2; petals 4, in 2 dissimilar, alternate whorls; outer petals entire to shallowly 3-lobed; inner petals deeply trisected with the two lateral lobes entire and the median lobe consisting of a slender stalk bearing a recurved, broadly expanded, mostly fringed apex; stamens 4, opposite the petals; ovary superior, of 2 carpels but 1-celled,

with a bipartite stigma; fruit an elongated capsule bearing seeds in one longitudinal row and disarticulating (if at all) transversely into 1-seeded sections (rarely dehiscing in 2 valves). Full descriptions can be found in the floras mentioned, particularly Popov l. c.

H. pendulum L. (1753), *H. parviflorum* Kar. & Kir. (1842) and *H. trilobum* Trautv. (1884) are all characterised by their mature fruits being pendulous and born on recurved pedicels. The fruits are straight or rarely slightly curved, compressed-tetragonal in transverse section, and are of the transversely disarticulating type. *H. parviflorum*, described from the area of Lake Balkhash in southern Russia, apparently occurs from Altai west to the eastern side of the Caspian Sea and in Pakistan, Afghanistan, Iran and Egypt (rarely; mediterranean coastal region), i.e. in the eastern sector of the range of *H. pendulum*. Popov (1937, transl. 1970) states that "the geographical boundary between *H. parviflorum* and *H. pendulum* has not been precisely determined." *H. trilobum*, described from Turkmenia, is apparently confined to Iran, Afghanistan and a small adjoining portion of southern Russia, from the south-east region of the Caspian Sea east to about Tashkent, i.e. like *H. parviflorum* it occurs in the eastern sector of the range of *H. pendulum*. The supposed distinctions between the three species are:—

> *H. pendulum* (s. str.)—Corolla pale yellow, small; outer petals entire, narrower than those of *H. parviflorum*, almost twice as long as wide; stigmatic branches short, divergent; fruit not (or only with difficulty) disarticulating into segments, the epidermis not peeling off.
>
> *H. parviflorum*—Corolla pale yellow, small; outer petals obscurely 3-lobed, to 7 mm long x 5 mm broad; stigmatic branches short, usually not divergent; fruit disarticulating (sometimes with difficulty), the epidermis peeling off the fruit body.
>
> *H. trilobum*—Corolla bright yellow, large; outer petals 3-lobed, 15 (–20) mm broad; stigmatic branches long, to 2 (–4) mm, divergent; fruit not (or only with difficulty) disarticulating, the epidermis not peeling off.

The distinctions refer to variable characters. Popov (1934) indicates that intermediates between *H. trilobum* and *H. parviflorum* are frequent. He states that *H. parviflorum* is very difficult to distinguish from *H. pendulum* and should probably be considered only as a variety or geographical race of *H. pendulum*. Krylov (1931) reduced *H. parviflorum* to subspecific rank as *H. pendulum* ssp. *parviflorum* (Kar. & Kir.) Krylov. Cullen (1966) treats *H. trilobum* and *H. parviflorum* as varieties of *H. pendulum* (var. *trilobum* (Trautv.) Cullen; var. *parviflorum* (Kar. & Kir.) Cullen) and states that "Intermediates between var. *pendulum*

and var. *parviflorum* are very frequent; var. *parviflorum* is only slightly distinguished from var. *pendulum* and does not seem worth specific recognition."

The *Hypecoum* material collected at Lake Boga in 1970 was not critically examined until dissected by the present author in May 1975 and recognised as a member of the variable *H. pendulum* group. A specimen was then sent to T. G. Tutin, University of Leicester, U.K., co-author of the account of *Hypecoum* given in *Flora Europaea*, with a request for his opinion. Tutin replied (pers. comm., 2 June 1975) that the collection " . . . is certainly *H. pendulum* L. The correlation between lobing of the outer petals, flower size and strongly recurved pedicels and pendulous fruits is not at all good and *H. trilobum* and *H. parviflorum* have, I think correctly, been treated simply as varieties of *H. pendulum* by J. Cullen in *Flora Iranica* (1966). Your specimens appear to combine the lobed outer petals of var. *trilobum* with the small flowers of var. *parviflorum*, a combination of characters that does not seem to have received taxonomic recognition."

A description of the plant, based on the Australian material and prepared by the present author is:—

Plant annual, glabrous, with a slender tap root. *Leaves* to 10 (–15) cm long, glaucous, radical, forming an erect to spreading rosette; petiole about one third to one half of the leaf length, slender, ca 0·5—1 mm broad, narrowly winged at the base; blade oblong in outline but deeply and finely divided with multiple-bisected segments arising alternately along the rhachis; rhachis very slender, appearing as a continuation of the petiole; bisections ca 0·25—0·5 mm broad, the distal ones apiculate. *Stems* several per plant, decumbent to ± erect, extending well beyond the leaves, smooth cylindrical, narrow, to 30 (–60) cm long, forking at intervals of 2–10 (–15) cm, 1–2 mm broad in the lower portions but more slender above (almost filamentous when in flower), leafless except where the stem forks and/or a pedicel arises and there bearing short reduced leaves. *Pedicels* born singly, each arising from the fork of a stem or else terminally, very slender and almost filamentous when in flower, lengthening and thickening in fruit and then ca 0·5–2 cm long x ca 1 mm thick, somewhat expanded under the fruit, and strongly recurved. *Sepals* 2, ovate, acute, 2–2·5 mm long. *Petals* 4, in two dissimilar, alternate whorls. *Outer petals* 2, yellow, ca. 9–10·5 mm long x 10–11·5 mm broad, distally shallowly 3-lobed, the 2 lateral lobes each a little broader than the median lobe and projecting laterally in a dentate shape, the median lobe directed distally, all lobes obtuse. *Inner petals* 2, ca 8 mm long and 5–6 mm broad at the summit, deeply 3–lobed, the lobes equalling about three fifths of the petal length, the petal with a small claw at the base; lateral lobes each ca 1·5–2 mm wide, ± parallel-sided, slightly falcate outwards, obtuse-rounded at apex, yellow with several scattered, purplish, oblong spots; middle lobe as long

as or very slightly shorter than the lateral lobes, yellow, and consisting of a slender stalk (basal two fifths of the lobe length) bearing a broad-oblong expansion at its apex, the expansion fringed on the edges, emarginate and recurved. *Stamens* 4, opposite the petals, ca 6·5 mm long; filament ca 4·5 mm long x 0·5 mm broad, flattened, tapered at the apex into a short, slender connective; anther ca 1·5 mm long, basifixed, 2–celled, linear, the cells splitting along lateral, longitudinal slits, each anther cell with a minute apical projection; filaments and anthers yellow, the filaments with several purple, oblong spots similar to

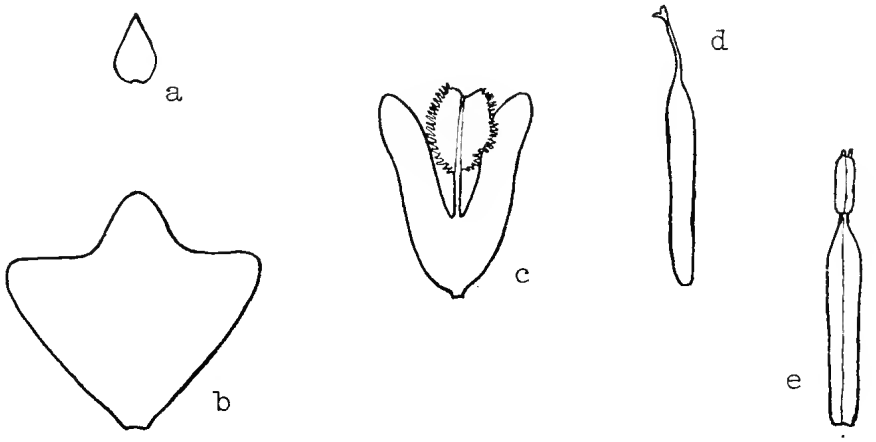

Fig 1.—*Hypecoum pendulum* L. (sensu lato); a—sepal, x 3; b—outer petal, x 3; c—inner petal, x 3; d—gynoecium, x 5; e—stamen, x 5. From KTRS 222/70 (MEL).

those on the lateral lobes of the inner petals. *Ovary* superior, slender, with a slender style bearing two very short divergent stigmas at the apex; stigmas and style extending just beyond the petals. *Ripe fruit* an elongated capsule 4–6 cm long, narrowly fusiform in outline and 2·5–4 mm wide at the broadest part, ± rectangular in transverse section with a prominent raised longitudinal nerve down the midline of each of the broader sides of the rectangle, sometimes also with a nerve on each of the narrower sides; capsule straight to slightly curved, pendulous from the apex of the recurved pedicel, hard, not readily disarticulating but if so then breaking transversely into 1–seeded articles. *Seeds* in one longitudinal row and apparently $>$ 10 per capsule, grey, 2–2·5 mm long, somewhat compressed, obliquely semicircular in outline.

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AUSTRALIAN LICHENOLOGY: A BRIEF HISTORY.

by

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The study of Australian lichens commenced in 1791 when Jacques Labillardiere accompanied Admiral d'Entrecasteaux on his unsuccessful voyage to the South Seas in search of La Perouse. During this voyage they visited Tasmania in the vicinity of Hobart and Labillardiere made extensive botanical collections. On returning to France he published an account of these collections in his *Novae Hollandiae Plantarum Specimen* in 1806. In this work he named, described and illustrated *Baeomyces reteporus* Labill., a lichen which he collected at "Cape van Dieman" (Tasmania). This is the common coral lichen found in abundance in most coastal heathlands of eastern and south-eastern Australia, and is now known as *Cladia retipora* (Labill.) Nyl. It is therefore the first lichen that was described for Australia.

In 1801 Captain Matthew Flinders left England for Australia in the "Investigator". Robert Brown was the Botanist on the expedition which reached the west coast of Australia on December 6th, 1801. They explored the coastline of the Great Australian Bight, entered Spencers and St. Vincents Gulfs, then proceeded around the south-eastern coast to Sydney. In July 1802 Robert Brown again accompanied Flinders when he sailed north from Sydney on his voyage around Australia. In an appendix to Flinder's *Voyage to Terra Australis*, Brown (1814) lists fifty-eight lichen species common to Australia and Europe which he collected on these expeditions. Brown's collections lay in the British Museum (Natural History) for 75 years until Reverend James M. Crombie examined it and published (1880) the names of 73 lichens, including 12 species new to science. Of these five were described by him and seven were described by Dr. William Nylander of Paris. Crombie says that "this valuable collection . . . . was made between the years 1802–05, during the voyage of Captain Flinders to New Holland and Tasmania. . . . . The tracts of country in which the following lichens were collected are New South Wales and the adjacent south coast of Australia, the north and south-west district of Tasmania or Van Dieman's Land . . . .". It is unfortunate that the actual sites given by Crombie are not always those where Brown collected the specimens. Most lichens are sensitive to environment, so it is most unlikely that Brown found his specimen of *Parmelia australiensis* Cromb. on Mount Wellington (Table Mountain) Tasmania, and even more unlikely "growing on rocks" (*see* Bibby 1951 : 186). *Chondropsis semiviridis* Nyl. was also re-

* National Herbarium of Victoria

Muelleria 3 (3): 183–190 (1976)

corded from Mount Wellington and as both this and the former species usually occur in low rainfall areas it is most probable that they were collected at Spencers Gulf in 1802 as Brown walked inland to the low hills of the lower Flinders Ranges in South Australia. Brown may have inadvertently put Tasmanian labels on the specimens or else the labels may have been mixed at a later date.

In 1817, Charles Gaudichaud-Beaupré accompanied Admiral Henri Louis Freycinet on his expedition to the South Seas in " L'Uranie ", and on returning to France published the results of his collections in the botanical part of Freycinet's *Voyage Autour du Monde* (1826). The lichens from this voyage were determined by Christian Hendrik Persoon and only four were collected in Australia; two from Port Jackson, New South Wales and two from Sharks Bay, Western Australia. However three of these species were new to Science: *Cenomyce australis* Pers. (now *Cladonia australis* (Pers.) Fr. syn. *Cladia aggregata* (Sw.) Nyl.) and *Parmelia angustata* Pers. (now *Anzia angustata* (Pers.) Müll. Arg.) from New South Wales and *Lecidea ochroleuca* Pers. from Western Australia. The remaining species was *Borrera chrysophthalmus* (L.) Ach. (now *Teloschistes chrysophthalmus* (L.) Th. Fr.) which was previously described from Cape of Good Hope.

In Caroli Linne's *Systema Vegetabilium* edited by Kurt Sprengel (vol. 4. 1827) only two Australian lichens are mentioned: *Cladonia retipora* (Labill.) Fr. from " Terra Dieman " and *Sticta Delisaea* Del. from " Ins King in freto Bass ad Nov. Holl ".

From 1839–42 Ludwig Preiss sometimes accompanied James Drummond on botanical excursions in the south-west of Western Australia and gathered many plant specimens, but the two were rivals and often at loggerheads. His lichen collections were sent to Elias Fries who published an account of them in *Plantae Preissianae sive enumeratio plantarum*, Vol. 2, which was edited in 1847 by Christian Lehmann. Of the twenty-three lichens two were described as new to science. These were *Cladonia scutella* Fr. and *Usnea pulvinata* Fr.

1839 saw Joseph Dalton Hooker accompanying Sir James Ross on his Antarctic Expedition. They left England in H.M. ships " Erebus " and " Terror " on 29th September and sailed via The Cape of Good Hope and Kerguelen arriving at Hobart on the 16th August 1840. From Hobart they sailed south visiting the Antarctic Continent and the Sub-antarctic Islands before returning to Hobart in the autumn of 1841. After a short visit to Sydney they sailed for New Zealand and eventually back to England via the Antarctic Continent, Cape Horn, Falkland Islands and the Cape of Good Hope. On returning to England Hooker drew up an account of the botany of the voyage, and the third and fourth volumes consist of the *Flora Tasmaniae* published during 1855-60. In this work Churchill Babington and William

Mitten enumerated the ninety-three lichens of which two species, *Sticta cetrarioides* Bab., (now *Heterodea muelleri* Nyl.) and *Baeomyces heteromorphus* Nyl. were new to science.

After Hooker's visit to Australia James Drummond sent to him a number of lichens from the Swan River Region in Western Australia. Over the following years these were passed on to Thomas Taylor, Jean F. Camille Montagne and Joseph Miles Berkley who published their names and descriptions in various papers in the *London Journal of Botany*.

In 1847 Dr. Ferdinand von Mueller emigrated to South Australia from Germany on the advice of Ludwig Preiss. He found employment with a chemist in Adelaide and in his spare time commenced the study of the local flora. He sent his lichen collections to Dr. Georg E. Hampe in Germany who published their names and descriptions in *Linnaea* (1852). They included the first collection of two species new to science, *Biatora byssaceae* Hampe and *Sticta muelleri* Hampe (now *Heterodea muelleri* (Hampe) Nyl.), the last species named in honour of Mueller. Early in 1853 Mueller was appointed to the position of Government Botanist, in Melbourne, in the Colony of Victoria. In the report of the Government Botanist for 1854 Mueller transcribed from *Linnaea* a list of thirty-one lichens from the Colony of Victoria.

Dr. William Nylander published his *Synopsis Methodica Lichenum* in 1858-1860 and in it he recorded seventy-seven lichens from Australia. It was Nylander who revolutionised the study of lichens by introducing chemical tests with potassium hydroxide and calcium hypochlorite as an aid to taxonomy.

Nylander mentions collections from "Sidney (sic) Novae Hollandiae" in his *Synopsis* (1858–69). These were collected by Jules Pierre Verreaux who was sent out to Australia by the Director of the Museum of Natural History in Paris. Verreaux collected in Australia and Tasmania for about seven years and when he returned to France in 1851 he took with him some 115,000 plant specimens. These were mainly of flowering plants but they did include a number of cryptogams.

In August 1863 Amalie Dietrich arrived in Brisbane on "La Rochelle" from Hamburg at the expense of J. C. Goddefroy a wealthy Hamburg merchant who had his own private museum of natural history. Dietrich collected mainly around Brisbane and in the north of Queensland for ten years. In 1871 she visited Ferdinand von Mueller in Melbourne, but after a short stay she returned to Queensland. There is no record of the number of lichens which Dietrich collected but many duplicates of her specimens were returned from Goddefroy's Museum to Ferdinand Mueller in Melbourne.

Friedrich Ludwig Leichhardt led an expedition in northern Australia from Jimbour, Queensland to Port Essington, an early settlement in the far north of the Northern Territory, in 1844–1845. He collected plant specimens for Ferdinand Mueller and

amongst these were several lichens which Mueller sent for determination to Dr. A. Krempelhuber, in Munich.

Rev. William Woolls arrived in New South Wales from England in 1831 and from 1832 followed his profession as Assistant Master at Kings School, Parramatta, New South Wales. Whilst there he spent much time exploring the bush around the district. In 1867 he published his *Contribution to the Flora of Australia* which included discussion of twenty-five lichen species that he collected in the Parramatta region.

Dr. Anton Krempelhuber (1870) records six lichens collected on the "Novara" Expedition. The list includes one species new to science, *Parmelia jeleneckii Kremp.* "New Holland" is the only locality given for these collections, but members of the expedition visited areas from Newcastle to Wollongong, New South Wales, in November 1858. It is recorded that they stayed with a Mr. A. W. Scott on Ash Island, Hunter River, and returned with botanical collections.

Ferdinand Mueller as Government Botanist of Victoria (1853–1896) had many plant collectors working for him. Charles French was originally plant propagator at the Melbourne Botanic Gardens. He travelled all over Victoria collecting plants for the Melbourne Herbarium. Mrs. Annie McDonald McCann who lived on a property just south of Mitta Mitta, Victoria, corresponded with Mueller and sent him plant collections from north-eastern Victoria. Edwin Merrall collected many specimens for Mueller in East Gippsland and later in Western Australia. Daniel Sullivan, headmaster of Moyston school, collected in and around the Grampians in Western Victoria. Carl Walter a professional seed collector began collecting plants for Mueller soon after his arrival from Germany. He collected in East Gippsland and other remote regions in Victoria. Johann Friedrich Carl Wilhelmi was also a professional seed merchant and botanical collector. He lived in South Australia and sent specimens from Eyre Peninsula, Port Lincoln and Mt. Gambier to Mueller. He later came to Melbourne where he became Acting Government Botanist in Mueller's absence. While in Victoria he made collections from the Dandenong Ranges and from the Grampians. The lichens collected by these early collectors were examined by Krempelhuber who published the names of one hundred and twenty-two species in his *A New Contribution to the Lichen Flora of Australia* (1880). Later collections were sent to Professor, Jean Müller (Müll. Arg.) at the University of Geneva, Switzerland. Müller tended to be a "splitter" and many of his "species" are based on small fragmentary specimens. However he described the greater part of the Australian lichen flora and it is mostly due to his efforts that we have useable names now.

Dr. Charles Knight, a New Zealand surgeon, visited Australia in c.1881 and collected fifty-two species of lichen in the neighbourhood of Sydney, New South Wales. He described them in the *Transactions of the Linnean Society of London* (1882).

This paper includes the descriptions and figures of forty species new to science. Fredrick Manson Bailey, Government Botanist in Queensland, sent many of his own collections from around Brisbane, together with those of Carl Heinrich Hartmann from the Toowoomba-Darling Downs region and Mrs. Flora Martin (see Campbell) from eastern Victoria to Knight. Bailey published the results of these investigations in his *Synopsis of the Queensland Flora* (1883).

Many other botanical collectors were working in Queensland at this time. Edward Macarthur Bowman was employed on Queensland stations and collected in north-eastern localities. James Keys was a resident of the Mt. Perry District and collected there. John Shirley was a school master and later Inspector; in his latter capacity he travelled widely and made extensive collections throughout the state. W. A. Sayer a cousin of Charles French was commissioned by Ferdinand Mueller to collect botanical specimens in Queensland. All of the specimens collected by these workers were sent to Mueller who sent duplicates to James Stirton and Jean Müller for determination.

In 1880 Hugh Paton from Glasgow made a tour around southern Australia and New Zealand. Five species which he collected in Victoria were named by Stirton and published in the *Transactions and Proceedings of the Royal Society of Victoria* (1881).

Richard Helms was naturalist and botanical collector with Sir Thomas Elder's Expedition to Central and Western Australia in 1891–1892. The expedition, under the command of David Lindsay set out from Warrina Railway Siding in South Australia and headed north-westward to the Everard Ranges, then turned westward into Western Australia. On reaching the Barrow Ranges they turned south-westward to the Frazer Range where they again turned north-westward to Mt. Magnet. Helms collected extensively during the whole journey and in the report of the expedition (Lindsay, 1893) numerous references are made to him arriving back in camp late from his scramblings in the mountains. The plant specimens which he collected were sent to Ferdinand Mueller in Melbourne. F. Mueller forwarded the lichens to Jean Müller in Geneva who reported on fifty-four species (Müll. Arg., 1892) in Hedwigia. Twelve of these were described as new species including *Endocarpon helmsianum* Müll. Arg., named in honour of its collector.

Reverend Francis Robert Muter Wilson was Minister in Charge of the Presbyterian Church at Kew, Victoria, from 1877 to 1897 when he retired to Canterbury, Victoria. Wilson collected prolifically in eastern Australia from Tasmania to Brisbane, including Melbourne suburban areas and on Lord Howe Island. Many of his collections were from the " Asylum Grounds Kew ". Between the years 1887 and 1900 he published twenty papers on his lichen collections, describing many species and subspecies as new to science. His main collection was donated to the

National Herbarium of Victoria, Melbourne and a duplicate collection was purchased by the National Herbarium of New South Wales. The bulk of the Melbourne collection was packed into a large crate, described by Professor Ewart, then Government Botanist of Victoria, as weighing over one hundredweight. This crate was sent through the Transport Department to Dr. Giocomo Albo at the University of Messina, Sicilia (Italy) on the 11th September 1907. It was unfortunately lost at sea, or landed at the wrong European port, as it was never heard of again. This was a great loss to Australian lichenology, as most of Wilson's type collections were in the crate. Fortunately Dr. Albo had received a small parcel previously, containing a number of type specimens. These specimens survived an earthquake which demolished the Botany Department at the University. They were eventually returned to Melbourne and form the basis of the National Herbarium's Wilson collection. The major part of the Wilson herbarium now extant is the duplicate collection held in the National Herbarium of New South Wales.

During Wilson's time another collector was active on the Victorian scene—Richard A. Bastow, an Architectural Draughtsman. He also was a prolific collector, taking dozens of duplicates from each locality. He was born in Edinburgh, Scotland, and emigrated to Tasmania in 1884 where he made many collections in the vicinity of Hobart. Later he moved to Victoria where he became an active member of the Field Naturalists Club. His paper *Notes on the Lichen Flora of Victoria* with one plate containing one hundred and twelve figures was published in the *Victorian Naturalist* (1914).

Edwin Cheel was engaged as a gardener at the Sydney Botanic Gardens where he also had care of the Cryptogamic Herbarium. He compiled a *Bibliography of Australian Lichens* (1903) and this was supplemented in 1906 by a second paper including New Zealand and the South Seas Islands. This very valuable contribution lists nearly every paper that had ever been published on Australian lichens up to that time. In 1908 he was appointed to the staff of the National Herbarium of New South Wales and rose to the position of Chief Botanist and Curator; a position which he held until his retirement in 1936.

After Wilson's death in 1903 the study of Australian lichens lapsed until 1938 when a promising gardener in the Royal Botanic Gardens, Melbourne, Patrick Noel Sumner Bibby, moved into the herbarium to assist with the plant determinations. Bibby became very interested in cryptogams, particularly in lichens and hepatics. He only published six short papers on lichens, but his most important contribution was the compilation of an index to all of the species of lichens described for Australia. This index is on cards and it is unfortunate that it was never published.

James Hamlyn Willis, Assistant Government Botanist at the National Herbarium, Melbourne, until 1972 is also interested in lichens. He and Bibby collaborated in their studies and after

Bibby died in 1955, Willis published a new genus, naming it *Bibbya* in his honour. This action was prompted by Dr. Carroll Dodge (St. Louis, Missouri) who received material from Bogong High Plains collected by Bibby. Unfortunately this lichen was not new; it was *Toninia bullata* a species found growing in South America and Tierra del Fuego (see Willis 1959:91).

In recent years Australia has been fortunate in having a few very enthusiastic lichen collectors. Chief amongst these are J. H. Willis who has always collected lichens on his many botanical excursions around the continent (see Muelleria 3:74). Alan Clifford Beauglehole who has collected in all states except Tasmania; Rex B. Filson who has collected in all southern Australian States and south-east Queensland; Nathan Sammy who is working on the lichens of Western Australia: Rodrick W. Rogers, Rodney D. Seppelt, Nikolai Donner and Lindley D. Williams who have collected widely in South Australia; Geoffrey C. Bratt and Joseph A. Cashin who have made large collections throughout Tasmania; and John C. Whinray who has made an extensive survey of the lichen flora of the Bass Strait Islands. Recent collections are being used by present day lichenologists in the preparation of publications on the Australian lichen flora.

A complete bibliography of Australian lichens is beyond the scope of this current sketch but extensive bibliographies are to be found in *Catalogue of the Lichens of Tasmania* Wetmore (1963) and *Catalogue of the Lichens of Australia exclusive of Tasmania* Weber and Wetmore (1972).

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CALANDRINIA VOLUBILIS BENTH. IN VICTORIA AND SOUTH AUSTRALIA.

by

MARY A. TODD*

Plants of *Calandrinia volubilis* Benth. sensu stricto have now been collected in Victoria and voucher specimens have been placed in the National Herbarium of Victoria. Its occurrence in South Australia has been confirmed thus adding to its previously known distribution in N.S.W. where the lectotype was collected.

In the past this name has been misapplied to some extent. Ewart's (1931: 487) claim that it occurred in Victoria and was widespread was refuted by Willis (1972: 129) who stated that there were no voucher specimens of it from Victoria at the Melbourne Herbarium. He assumed that the records of *C. volubilis* were misdeterminations of *C. eremaea* Ewart. Black (1948: 348) listed the species for much of South Australia though he stated that he was unable to distinguish it from *C. pusilla* Lindl. (1848) *non* Barneoud (1847) = *C. eremaea* Ewart. Eichler (1965: 138) saw one of the syntypes of *C. volubilis* Benth. at the Kew Herbarium and designated it as the lectotype of the species. He confirmed that the plant that Black described as *C. volubilis* was actually *C. eremaea* Ewart and doubted the presence of *C. volubilis* Benth. in South Australia.

The first specimens of Bentham's *C. volubilis* from Victoria came to the National Herbarium of Victoria in November, 1974. The first of these was collected at Lake Ranfurley, a salt lake about 6 km west of Mildura, by Mr. J. H. Browne, of Red Cliffs, on 8th November, 1974. He found only three plants of it.

Mr. Browne made a second collection of this species in Victoria on 23rd November, 1974. Then he found that it was common over 4 hectares in the north-west corner of the Raak Plain near the ochre deposits i.e. about 50 km south-south-west of Mildura. It was found climbing on nearly every plant of Grey Glasswort (*Arthrocnemum*). The other dominant plant was Rounded Noon-flower (*Disphyma*). At Lake Ranfurley it was also growing in association with these two species.

Shortly after this, the first specimen of *C. volubilis* to be found in South Australia for over a hundred years was collected by R. J. Chinnock. It is his number 2404, collected in the Redcliff Survey area at 32° 42′ S, 137° 51′ E (i.e. approx. 22 km. south-south-east of Port Augusta) on 14th January, 1975. It was growing up *Atriplex* plants in an *Atriplex vesicaria*

* National Herbarium of Victoria.

Muelleria 3 (3): 191–196 (1976)

association on the north side of the promontory and was common in the area. Specimens of this collection have been lodged at the State Herbarium, Adelaide and the National Herbarium of Victoria.

These are interesting occurrences. Not only do these specimens include the first records of this species in Victoria but they are the first specimens of the species to have been added to the collections in the National Herbarium of Victoria since the species was described by Bentham in Flora Australiensis (1863, 1 : 174). Prior to 1863 the species had been collected from two widely separated areas—(1) near the Darling River in N.S.W. by Beckler in 1860 and (2) Port Lincoln in South Australia by Wilhelmi. Both of these specimens were cited by Bentham when he described the species and are therefore the syntypes of the species.

The specimen labelled "*Calandrinia calyptrata* J. Hook. var. *volubilis*. Near R. [River] Darling. 1860. NE Exp. Dr. Beckler" and housed at the Kew Herbarium has been selected as lectotype by Eichler (1965 : 138). In 1860 Dr. Beckler was collecting plant specimens with the Victoria Exploring Expedition. For most of October and November of 1860 this Expedition was on or close to the Darling River, for much of the time in the region of Menindee (Willis 1962 : 255–56). In the Melbourne Herbarium there are three other specimens collected by Beckler at this time. They are a good match for the lectotype but are not to be regarded as syntypes.*

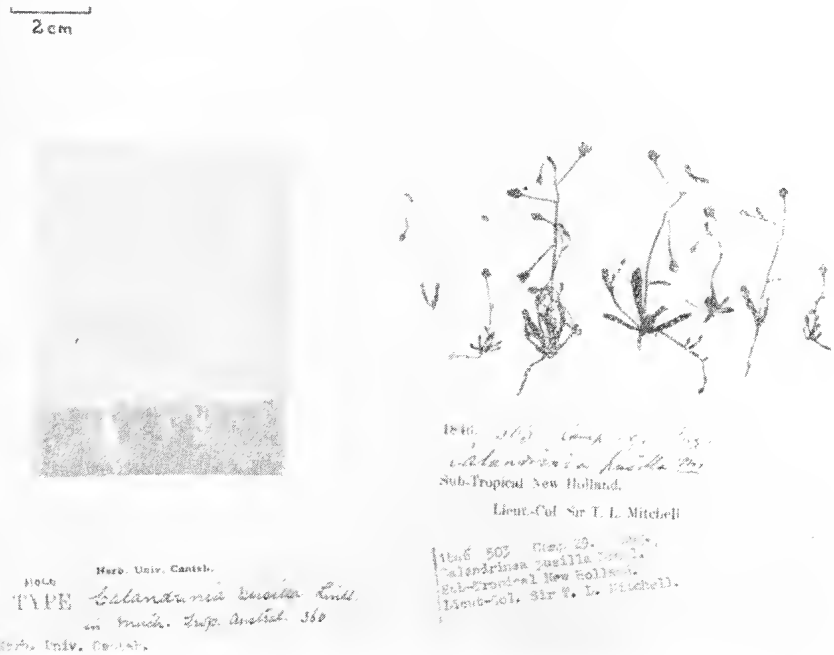
The second syntype is at the National Herbarium of Victoria. It is labelled "*Calandrinia calyptrata* J. H. *β volubilis* Ferd. Mueller, Port Lincoln. Wilhelmi. *C. volubilis* Benth." There is a "*B*" on the back of the label, showing that it was seen by Bentham. This specimen matches the lectotype in all essential characters (flexuose pedicels and inflorescences, non-reticulate sepals, narrow obconical capsule at least twice as long as the calyx and deeply pitted seeds).

* Only one of the three Beckler specimens which are now in National Herbarium of Victoria was sent to Bentham when he was writing the Flora Australiensis. It is MEL 48858, labelled "B. Cal. volubilis scarcely a var. of C. pusilla though the seeds are similarly pitted", "B. Cal. pusilla Lindl. seeds pitted" and "Calandrinia volubilis Benth. Yoyinga Mt. Nov. 5. 1860 Beckler." It is, as the two labels in Bentham's handwriting suggest, mixed material, being one fruiting shoot with three leaves which is apparently referable to *C. eremaea* Ewart (syn. *C. pusilla* Lindl.), three robust vegetative shoots (probably referable to *C. volubilis* Benth. and an envelope of broken fruiting material of *C. volubilis* Benth. This collection was not cited by Bentham with his original description of *C. volubilis*. "Yoyinga Mt." is apparently some kilometres from the Darling River. According to Willis (1962 : 256) it is in Scrope Range in the vicinity of Kokriega Well, about 43 miles (69 km.) east of Broken Hill. In the National Development 1 : 250,000 map this is spelt Scopes Range. The southernmost part of it is about 24 km. north of the base camp of the Victoria Exploring Expedition at Lake Pamamaroo (which is about 13 km. north of Menindee). "Yoyinga Mt." is thus some kilometres from the Darling River.

Apparently neither of the other two Beckler specimens in National Herbarium of Victoria was sent to Bentham by Mueller (neither bears a "B" in th corner of the label). They were collected on different dates (MEL 48859 on 31.x.1860 and MEL 48857 on 3.xi.1860). Both bear the label "Near Darling River", and the latter has in addition "Bambameroo" which is one of the variants used by Beckler for the base camp at Lake Pamamaroo. Both are also labelled "Calandrina Calyptrata J. Hook. var. volubilis."

It is probable that Mueller considered them to be identical with the specimen labelled "near the Darling River. Beckler" which is now at Kew, so did not send them to Bentham with the other specimens. However on the evidence available they can hardly be considered to be syntypes of *C. volubilis* Benth.

PLATE 11.



Type of specimen of *Calandrina pusilla Lindl.* and *C. eremaea* Ewart, *Mitchell* 503.

This material of *Calandrinia volubilis* Benth. was also compared with the type of *C. eremaea* Ewart (syn. *C. pusilla* Lindl.) as there has been confusion between these two species in the past in Victoria and South Australia.

When he described *C. eremaea* in the Flora of Victoria Ewart (1931 : 486–87) gave a brief description of the plant and stated that the name is to replace *C. pusilla* Lindl. (1848) which is invalid as Barneoud used that name for a Chilean species in 1847. The type of *C. eremaea* is therefore the type of *C. pusilla* Lindl. That was collected on the Maranoa River, Queensland on Mitchell's expedition in August, 1846 at camp 29 (also the site of the second depot), lat. 26° 15′ S, long. 148° 06′ E (see map IV Mitchell, 1848 : opp. 133).

It is 2–6 cm. high (a smaller plant than *C. volubilis*) with straight pedicels and inflorescence stems, ovoid capsules 3·5 mm long and 2·5 mm broad (less than twice as long as broad) and shallowly pitted seeds. The latter character does not appear to be constant for the species. The eleven Victorian collections in the National Herbarium of Victoria in January, 1976 which are thought to be referable to *C. eremaea* are similar in most respects but include plants up to 25 cm. long, and three of the collections (from near Werribee River, *C. French*, x. 1890 (MEL 48668); Hills near Anthony's Cutting, Bacchus Marsh, *J. R. Tovey*, 3.xi.1910 (MEL 48669); and Moyston and Mount William, Sandhills among rocks to about 1200 ft., *D. Sullivan*, ix. 1879 (MEL 48677) have deeply pitted seeds.

At a magnification of approximately 140 the seeds of the Lake Ranfurley specimen of *C. volubilis* appear to be covered with a regular pattern of smooth tuberculate projections. The spaces between these projections are seen as deep pits at a magnification of 20. The seeds of the type of *C. pusilla* and *C. eremaea* show a similar pattern but the projections appear to be smaller and at a magnification of 20 shallow pitting only is observed—the seeds have a surface pattern but appear to have smooth edges.

It is therefore suggested that specimens of *C. volubilis* may be separated from those of *C. eremaea* by the following characters:

—	*Calandrinia volubilis* Benth.	*C. eremaea* Ewart
Pedicels and inflorescence stems	Flexuose	± straight
Capsules	horn-shaped (obconical)	ovoid
,, length	6–9 mm	3–5 mm
,, breadth (dry)	2 mm	2–3 mm
,, l/b	3 to 4	1½
Pitting on seeds	deep	shallow or deep
Plant	robust	slight

PLATE 12.

Calandrinia volubilis Benth. from Lake Ranfurley.

That C. *volubilis* is not a common plant is emphasised by Eichler's statement (1965 : 138) that he had seen nothing like the lectotype in South Australia. The recent Victorian and South Australian specimens were collected from *Arthrocnemum* and *Atriplex vesicaria* associations after a wet winter. It may be that this is needed for flowering. October-November 1860 was apparently a good flowering season near Menindee in the region where Beckler's specimens were collected. Beckler wrote of Scrope Ranges, (37 km. north of Menindee and 23 km. north of their base camp at Lake Pamamaroo) "most of the shrubs growing in the hills are just now in blossom" (Willis, 1962 : 251). It may also be that the flexuose inflorescences with many flexuose pedicels make the plants look abnormal and that it has been overlooked for that reason when it flowered. When not in flower the plant is probably less than 20 cm. high with crowded terete, succulent, linear leaves up to 44 mm x 11 mm in size (see Plate 2). Bentham's description (1863 : 174) fits the plant well.

This plant should be relatively easy to see when it is in flower and it is hoped that it may be collected again in the drier areas of Victoria, N.S.W. and South Australia before another century elapses.

ACKNOWLEDGMENTS.

The author wishes to thank the Director of the Kew Herbarium and the Curator of the Cambridge University Herbarium for the loan of type specimens, Mr. Bruce Fuhrer, of the Monash University Botany Department, for photographs of seeds, and the General Photographic Section, Department of Crown Lands and Survey, for photographs of herbarium specimens.

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A NOTE ON THE RELATIONSHIP OF EUCALYPTUS RISDONII HOOK.F. VAR. ELATA BENTH. TO EUCALYPTUS DELEGATENSIS R. T. BAKER.

by

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Eucalyptus delegatensis R. T. Baker, *Proc.Linn.Soc.N.S.W.* **25**: 305–308 pl. XVI (1900).

Eucalyptus risdonii Hook.f. var. *elata* Benth. Flora Australiensis **3**: 203 (1866).

Eucalyptus tasmanica Blakely, Key to the Eucalypts: 225–226 (1934) quoad nom., non descr.

Eucalyptus gigantea Hook.f. *Lond.Journ.Bot.* **6**: 479 (1847).

E. risdonii Hook.f. is a small tree or mallee-like shrub restricted to lowland open forest below 150 metres elevation in the south-east of Tasmania. With *E. tenuiramis* Miq., a larger tree of wider distribution, extending to altitudes near 450 metres, it forms the Superspecies Risdonii of Pryor and Johnson.

E. risdonii var. *elata* was described by Bentham from material collected by R. Gunn in 1841 from the western shores of Lake St. Clair, central west Tasmania, a locality outside the range of Superspecies Risdonii and 300 metres higher. This taxon is listed as a synonym of *E. tenuiramis* by Pryor and Johnson (1971).

Through the courtesy of Mr. G. M. Chippendale who was Australian Botanical Liaison Officer at Herbarium Kewensis, August 1972 to August 1973, I was able to examine photographs of eight sheets of the bulk collection 1095 of Gunn, upon which Bentham based his description. None of the material is assignable to the Superspecies Risdonii. Clearly it belongs with material now referred to *E. delegatensis*.

Bentham apparently believed the trees from which the material was collected, at Lake St. Clair, to be convarietal with a species which occurs commonly in the south-east of the State. Willis (1967 : 134) has shown this latter species to be *E. tenuiramis* Miq., vice *E. tasmanica* Blakely, in part. Present day knowledge indicates that no representatives of the Superspecies Risdonii occur within a significant distance of Lake St. Clair.

Nomenclaturally, Blakely based his *E. tasmanica* on Bentham's variety so that the names *E. tasmanica* and *E. delegatensis* refer to one and the same species but the description obviously belongs to the larger forms of *E. risdonii* (*E. tenuiramus*) common in S.E. Tasmania. It is of interest that Blakely did not cite Lake St. Clair as a locality for his *E. tasmanica*.

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Muelleria 3 (3): 197–198 (1976)

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A NEW COMBINATION IN FLEMINGIA W. T. AITON (PAPILIONACEAE)

by

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Flemingia schultzii (F. Muell.) J. R. Maconochie comb. nov.
Psoralea schultzii F. Muell. in Fragmenta 9: 155 (1875).
Flemingia racemosa Domin in Bibliotheca Botanica 14 (89): 230–31 (1926).
Moghania racemosa (Domin) Li in *American J. of Botany* 31: 277 (1944).

In his original description of *Psoralea schultzii* Mueller cited 457 indicating that he had only seen fragmentary material but considered it to be readily distinguishable from other members of this genus. An examination of the type sheet (MEL 54413) in the National Herbarium of Victoria, Melbourne, shows the collector and locality as " Schultz " and " Port Darwin " respectively. This sheet only has inflorescences and a fragment of a leaf but lacks fruits (F. Mueller noted " fructus mini ignoti "). An examination of the flowers shows that it belongs to *Flemingia* and not *Psoralea* (wings adherent to keel and ovary subsessile). An isotype in the Kew Herbarium, England (Schultz 457) has complete leaves, fruits and flowers (photo seen).

K. Domin (1926) cited F. Schultz 457 and W. Hann 233 and 244 as syntypes of *Flemingia racemosa* Domin.

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THE SPECIES OF ADONIS L. NATURALIZED IN AUSTRALIA

by
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SUMMARY

Hitherto, the species of *Adonis* naturalized in Australia have been identified as *A. annuus* and *A. aestivalis*. This study reveals that on the basis of achene morphology, these two species are not present in Australia. The naturalized species is actually *A. microcarpus* DC. A detailed description based on Australian material is provided, and the distribution of the specimens lodged in Australian herbaria is recorded.

INTRODUCTION

On a world-wide basis, the annual species of *Adonis* (Fam. *Ranunculaceae*) are most conspicuous as garden plants. They have been cultivated for almost four hundred years in Europe and Great Britain and have been spread far from their native Mediterranean habitat to the Americas, Asia and Australia. In restricted localities, some species have begun to cause problems as weeds of crop or pasture. This has happened in parts of the cereal belt of South Australia.

A study of the weed revealed, *inter alia*, that the current Australian nomenclature was inconsistent with both the specimens and the descriptions published in the local literature. Hitherto, this plant was identified as *A. annuus* L. emend Huds. (syn. *A. autumnalis* L.). This originated from the early botanists, Maiden (1912) in New South Wales, Manson–Bailey (1909) in Queensland, and Black (1919) in South Australia, who, knowing it to be a garden escape, assumed it was the species commonly grown in Great Britain. Later workers appreciating that the morphology of Australian specimens differed markedly from European descriptions of that taxon suggested that it was *A. aestivalis* L., another British garden species (Eichler, 1965; Willis, 1972). The determination of the Australian material is reported in this paper.

MATERIALS

Fresh material was examined in the field at every opportunity, and collections made where practicable in South Australia between 1968 and 1972. The collected material was lodged in the State Herbarium, Adelaide (AD).

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Muelleria 3 (3): 200–207 (1976)

Both local and overseas specimens of *Adonis* were kindly made available by the curators of the following herbaria: State Herbarium, Adelaide (AD). Herbarium, Waite Agricultural Research Institute, Adelaide (ADW). Queensland Herbarium, Brisbane (BRI). Herbarium, Canberra Botanic Gardens (CANB–BG). National Herbarium, Melbourne (MEL). Herbarium of the University of New England, Armidale (NE). National Herbarium, Sydney (NSW). Herbarium of the Northern Territory, Alice Springs (NT). Western Australian Herbarium, Perth (PERTH). Herbarium, Department of Agriculture, Adelaide. Personal herbarium of Dr. Hj. Eichler, Canberra, formerly of Adelaide.

The material was critically examined for variability in achene size and shape and, where relevant, petal colour.

As type specimens and other basic diagnostic material are unavailable in Australia, reference was made to the various accounts mentioned herein, but greatest reliance was placed on the revision by Dr. H. Riedl (1963).

The extra-Australian material available for examination, together with descriptions and keys in the European literature, gave an opportunity of gaining an appreciation of the taxa in their native countries and enabled the placement of the Australian specimens.

The determination of the Australian material thus achieved was confirmed by both Dr. H. Riedl (W) and Professor C. Steinberg (FI).

OBSERVATIONS

A full description of the plant is given on p. 204. Only the features of the flowers and fruit required for the species determination will be considered in this section. A discussion of the variation in vegetative characters, and other floral features not included here is available elsewhere (Kloot, 1973).

Flower colour: The material from all States except South Australia invariably had red petals. Most of the South Australian material was also red, but yellow-flowered plants are found in two localities: the Roseworthy–Freeling area about 40–70 km north of Adelaide, e.g. AD 97202249, and the South Hummocks area about 90–100 km north-north west of Adelaide, e.g. AD 96933755.

It was noticed that red-flowered specimens from well-favoured areas tend to be crimson, whereas in less favoured sites the flowers tend to be scarlet.

The Achene: A diagrammatic sketch of an achene is shown in Fig. 1. All the terms used in describing the achene are shown there.

Size: Apart from the N.S.W. material where the achenes were generally 2·5 to 3·0 mm long (including the beak), the Australian examples ranged from about 3·0 to 3·5 mm long, although larger achenes to 4·5 mm long were seen.

SHAPE: No basal tooth on the achene was seen in Australian specimens. This is an essential characteristic of *A. aestivalis* and its patent absence in local material unequivocally rules out the possibility of this taxon being present in the current collections.

A transverse ridge is always found in mature Australian achenes. In larger achenes there is a tendency for the ridge to be undulate whereas in smaller (but mature) achenes the ridge is dentate. The dentate ridge is most highly developed in specimens from the Northern Flinders Ranges in South Australia (AD 96529270) and from Parkes in N.S.W. (NSW 63759), and to a lesser extent in a collection from Alice Springs N.T. (NT 9338) and Georgetown S.A. (AD 97202263).

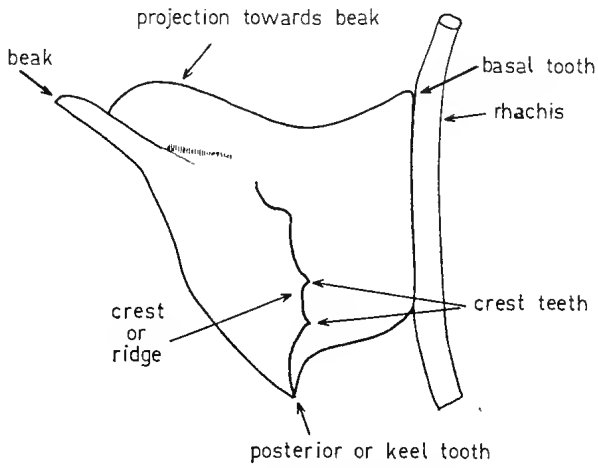

Fig. 1.—Generalised diagram of *Adonis* achene illustrating descriptive terms used in the text.

At the most posterior point on the ridge a tooth varying in size and prominence is always present. Where the crest is dentate, this posterior tooth is usually less obvious; conversely, if the crest is undulate this tooth is generally more prominent.

In the Australian material, the projection on the exterior surface close to the beak is always present in mature achenes. In *A. annuus*, this projection is never found. It is not so close to the beak that they touch as in *A. flammeus*, nor is it as far removed as in *A. aestivalis*. In the latter species it is about one-third to one-half of the distance from the beak back towards the base of the achene. In local material it is generally only one-fourth this distance.

THE DIRECTION OF THE ACHENE BEAK: This distinction between a beak pointing horizontally (i.e. perpendicularly to the rhachis and a beak pointing vertically (i.e. parallel to the rhachis) is virtually the sole criterion for a number of authors to divide

Fig. 2.—Typical spike of *A. microcarpus* illustrating the effects of stem position on achene maturity and beak direction.

A. cupanianus Guss. from *A. microcarpus* DC. However, as shown in Fig. 2, the distinction between ascending and horizontal beaks is likely to be worthless. The lower, more mature achenes are often forced outwards, but as the smaller, upper achenes are not as crowded the beaks point upwards. If the lower achenes fall, then the plant appears to be bearing only achenes with ascending beaks.

Later authors, e.g. Riedl (*op cit.*), Tutin *et al.* (1964) and Davis (1965) ignore this distinction treating *A. cupanianus* as a synonym of *A. microcarpus*.

THE SUITABILITY OF MATERIAL FOR DETERMINATION: Critical taxonomic studies should be made on fully mature achenes. These fall readily from the rhachis, so unless they are collected carefully, enclosed and mounted separately on the herbarium sheet, they are usually missing. The achenes that do remain

are immature, and as these differ considerably from fully mature achenes, determination is impossible. Davis (*op cit.*) has previously drawn attention to unripe achenes leading to misidentification. The author's own observations (Kloot, 1973), indicate that for achenes to be suitable for taxonomic determination they must: (*a*) contain a viable (i.e. round, blackish-green) seed, (*b*) be the lowest occurring on the fruiting head, (c) be from healthy, well-watered plants growing under reasonably fertile conditions, and (*d*) be fully ripe, i.e. they will drop from the stem at a light touch.

CONCLUSIONS

Overall, there were only minor differences between all the specimens examined. If the criterion of achene maturity is strictly adhered to, then the only substantial variation is in the colour of the corolla being red or yellow and the degree of dentation of the transverse ridge.

As the yellow-flowered forms were only a very minor proportion of the population in specific locations and with no other differences, this feature does not constitute a specific difference. There was a distinct gradation in the degree of dentation on the transverse crest between plants from arid environments and those from wetter localities, to which attention has previously been drawn by Riedl (*op cit.*). Therefore, the degree of dentation is seen as continuous variation rather than indicating two discrete populations.

The names previously used in Australia, *A. annuus* and *A. aestivalis* are not applicable. The projection towards the beak and the presence of a ridge around the achene exclude the former, and the lack of a basal tooth, as well as the position of the projection towards the beak exclude the latter. By close examination of the literature, it is clear that of the annual *Adonis* spp. the only taxa that are not excluded are those of *A. dentatus* Del. ssp. *microcarpus* (DC.) Riedl and *A. dentatus* ssp. *intermedius* (Webb et Berth.) Riedl.

The local material compared very closely to the descriptions given by Davis (*op. cit.*) or Steinberg (*op. cit.*) for *A. microcarpus* DC. in which they include *A. dentatus* ssp. *intermedius* Riedl. This arrangement is useful for the Australian material as the specimens with well-developed dentate transverse ridges referred to previously, would be more closely referable to *A. dentatus* ssp. *intermedius* Riedl.

The European specimens available to the writer that were identified as *A. microcarpus* DC. or *A. cupanianus* Guss. were identical with or very similar to Australian material.

It is thus considered, and subsequently it was confirmed by Dr. Riedl in Vienna and Dr. Steinberg in Florence that the Australian representative of *Adonis* is referable to *A. microcarpus* DC. As Riedl's two subspecies are included in this taxon, the Australian material is adequately encompassed.

TAXONOMIC DESCRIPTION

Adonis microcarpus DC. *Syst.* **1** : 223 (1817)
A. cupaniana Guss. *Fl. Sic. Syn.* **2** (1) : 37 (1843); *A. dentatus* Del. subsp. *intermedius* (Webb et Berth.) Riedl in *Ann. Nat. Mus. Wien* **66**: 72 (1963); *A. dentatus* subsp. *microcarpus* (DC.) Riedl *op. cit.*: 73 (1963).

Annual erect to 55 cm high, often multi-branched; *stem* striate, sparsely villose towards base but glabrous above; *stem hairs* simple, colourless; *leaves* alternate, to 6 cm long and 4 cm broad obovate in outline upper leaves gradually diminishing, glabrous, bright green, deeply dissected, bi- or tripinnate with more or less linear segments, each segment to 4 mm long, 1 mm broad, terminal segment to 8 mm long, acuminate, lower leaves petiolate, upper leaves subsessile; leaf-like cauline *bracts* subtending the base of each petiole (lower leaves) or leaf (upper leaves).

Flowers (8–) 15–25 (–30) mm diam., solitary, terminal, borne on a peduncle which lengthens as the flower matures to be ± 4 times length of mature carpellary spike; *calyx* appressed to the spreading corolla, but reflexing when mature; *sepals* 5 to 12 mm long, 6 mm broad, obovate, sparsely villose towards base and on lower margins (hairs similar to stem hairs), glabrous elsewhere, purple, petaloid, apex obtuse, slightly undulate; *corolla,* suberect initially, but spreading flat as flowers mature; *petals* (5–) 6–8 (–10), to 15 mm long, 8 mm broad, obovate, glabrous, bright scarlet (also crimson and occasionally yellow) with black basal spot, drying to yellow in herbarium specimens, apex obtuse, sinuate to crenate, remainder of petal margin entire; *stamens* numerous, hypogynous consisting of dark purple anthers 1 mm long borne on filaments to 4 mm long; *gynoecium* of 10–50 superior carpels each with single-celled ovary containing one anatropous, pendulous ovule.

Achenes 10–50, conferted, maturing acropetally along the spike which is 1·0–2·5 cm long, the uppermost achenes rarely maturing; *immature achenes* ovoid to globose, little ornamentation if any, beak lying parallel to rhachis, colour varying from blue-green to off-white, individual achenes clinging firmly to rhachis; *mature achenes* 2·5–4·0 mm long with a short beak to 1 mm long protruding from the posterior-dorsel surface ± perpendicularly to the rhachis, globose, rugose, with transverse ridge, often toothed in specimens from arid situations, but the ridge tending to be obscure in plants obtained from favoured sites, keel tooth always present at bottom of transverse ridge, rugose surface, sandy-brown to off-white, occasionally dull shades of green; *seed* to 1·5 mm diam. round, plump, blackish-green.

Flowering from July to November.

Seedlings. Cotyledons linear, acute, to 4 cm long, 3 mm broad, pale yellow-green; *first true leaf* petiolate, similar to other stem leaves but considerably smaller. Seedlings emerge soon after opening rains in April to June depending upon the season.

DISTRIBUTION

In southern and eastern Australia, on calcareous soils, adventive in other areas. The collection sites of herbarium specimens examined are mapped in Fig. 3. Details of the examined material are listed hereunder. (Only selected specimens have been listed for South Australia).

SPECIMENS EXAMINED: Western Australia.—Cadoux, *R. D. Royce 8397*, 27.viii. 1967 (PERTH); Manmanning, *H. B. Smith & Co.*, ix. 1967 (PERTH); Toodyay, *J. D. & P. J. Somers*, viii. 1968 (PERTH).

Northern Territory.—4km N.W. Alice Springs P.O., Adventive in garden area, *R. Swinbourne 464*, 19.ix.1962 (NT 9338).
Queensland.—Darling Downs—Jimbour lands, *J. T. Bell*, 1909 (BRI 10032); Pirrinuan, *Barnes Bros.*, (BRI 10035); Pirrinuan, on Jimbour Creek, mainly low lying areas, 27.viii.1958 (BRI

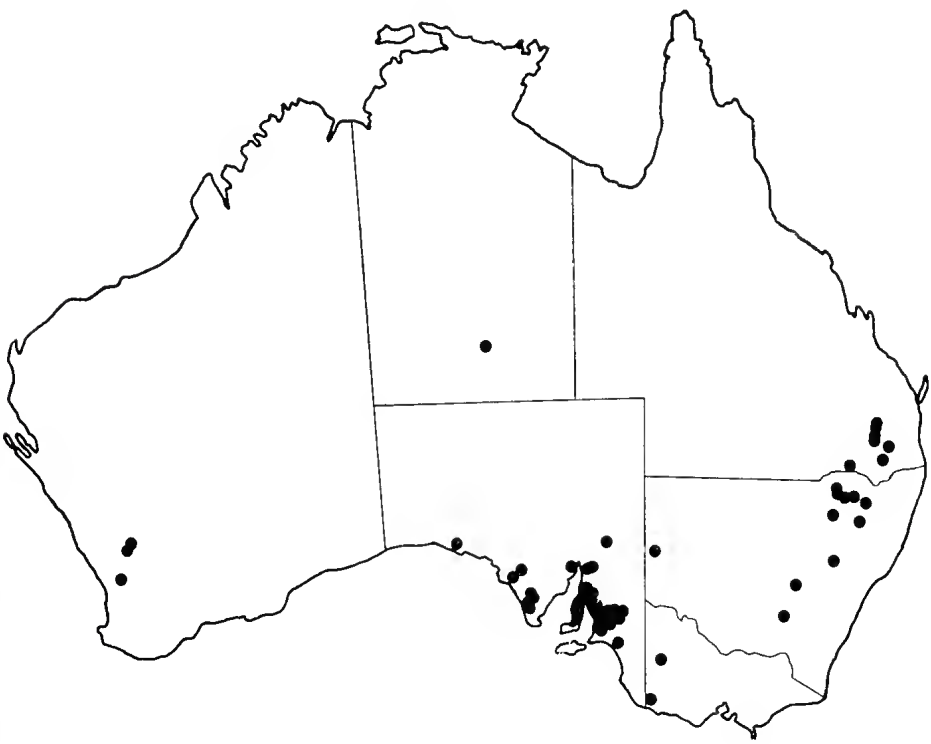

Fig. 3.—Collection sites of herbarium specimens of *A. microcarpus* DC. in Australia.

15719); Dalby, viii.1952 (BRI 10030 and BRI 146724); between Dalby and St. Ruth, black soil, *S. L. Everist*, 2.x.1954 (BRI 10034); Toowoomba, *H. Jarvis Bo. 2*, 10.x.1938 (BRI 10031); Goondiwindi, x.1905 (NSW 130030); Allora, close to old Talgai homestead, reddish-brown loam, *Huntely*, 10.viii.1962 (BRI 33483).

New South Wales.—North Western slopes—Moree, x.1909 (NSW 51324 and NSW 51325); Warialda, i.1910 (NSW 51328), x.1915 (NSW 51327 and NSW 51328); Inverell, viii.1912 (NSW 51324), x.1912 (NSW 51331 and NSW 51332), ix.1951 (NSW 51333), x.1905 (NSW 51335); Gurley (S.E. of Moree), x.1930 (NSW 51330); Terry Hie Hie (S.E. of Moree), no date (NSW 51326), *J. W. Simpson*, 12.xi.1968 (NE 25032); "Berrigal district" (a later note "may be Berrygill 33 miles N.E. Narrabri"), x.1903 (NSW 51339); Narrabri, ix.1955 (NSW 51336); Tamworth, ix.1955 (NSW 51337). Central Western slopes—Turill, ix.1962 (NSW 63758); Temora, x.1915 (NSW 51338); Parkes, 1963 (NSW 63759). Far Western Plains—Broken Hill, Hospital garden, *A. Rainbow*, ix.1927 (Ex coll. *Albert Morris*, ADW 16902).

Victoria.—Wimmera—Dimboola, *H. Faux*, early x.1960 (MEL 36765). Western District—"Lindsay" 40 km NE Mt. Gambier, *J. B. Cleland* 16.ix.1945 (AD 95828049).

South Australia.—Eyre Peninsula—Nundroo, 250 m W of road-house near house ruins, *S. J. Garrick*, 3.ix.1971 (Ex *Kloot*, AD 97308241); Mt. Hope, Hd. Kiana, Sn. 96, common on heavier flats between limestone rises, *C. R. Alcock*, ix.1968 (Ex *Kloot*, AD 97202240). Far North—Northern Flinders Ranges, ca. 10 km E of Angepena homestead on Italowie Gorge Road, *T. R. N. Lothian 2487*, 27.ix.1964 (AD 96529270). Mid North—1 km S. Redhill, small patch, *P. M. Kloot K7015*, 8.x.1970 (AD 97202256); Clare, 1917, (Ex *J. M. Black* colln. AD). Yorke Peninsula—2 km E. South Hummocks telephone exchange, red flowers, *B. Copley 1493*, yellow flowers—*B. Copley 1492*, 1.ix.1967 (AD 96933746 and AD 96933755 respectively); Hd. Tiparra Sn. 401, very widespread in area, *P. M. Kloot K7004*, 9.ix.1970 (AD 97202245); Stansbury, *H. W. Cornish*, 22.ix.1939 (ADW 3891). Lower North—Allendale North, Hd. Kapunda Sn. 1564, low fertility pasture, *P. M. Kloot K7003*, 10.ix.1970 (AD 97202244); Dutton, Hd. Dutton Sn. 102, *P. M. Kloot K7009*, 27.x.1970 (AD 97202251); Roseworthy, *A. Adams*, ix.1915 (Ex Herb. *A. Adams* incorp. in *J. M. Black* colln., AD); Roseworthy, Hd. Nuriootpa Sn. 719, red flowers, *P. M. Kloot K7007*, yellow flowers, *P.M. Kloot K7007A*, 2.xi.1970 (AD 97202248 and AD 97202249 respectively; Murray Mallee—Sutherlands, *Boehm*, 20.ix.1929 (Ex *J. M. Black* colln. AD); nr. Callington, Hd. Monarto Sn. 2016, *A. V. Lehmann*, 24.x.1966 (ADW 34662). Other—Beaumont, amongst weeds, *J. B. Cleland*, 5.x.1945 (AD 95828050, also dupl. in *J. M. Black* colln.); Coonalpyn, Hd. Coneybeer Sn. 24, *S. Whisson*, Spring 1971 (Ex *Kloot* colln. *K7102*, AD 97308202).

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THE CORRECT CITATION FOR TYPHONIUM LILIIFOLIUM

by

T. B. Muir* and D. Sinkora*

In the course of preparing a bibliography of Ferdinand Mueller's publications† the citation for *Typhonium liliifolium* given in Index Kewensis (1895) was found to be incorrect. The citation there is " F.Muell. ex Schott, Prod. Aroid. 107 ".

Mueller (1856), in discussing plants that he collected on the Gregory expedition, mentions " . . . a new one, a *Typhonium*, which forms a subgenus distinct from *Sauratium* . . .", but he gave no specific name nor description of the plant.

Schott (1859), who referred to Mueller's 1856 account, published a description which he attributed to Mueller, stating:

> " Allein nach der vom Autor brieflich mitgetheilten, an Ort und Stelle entworfenen Beschreibung, die wir hier nun folgen lassen, reiht sich dasselbe den echten Typhonien (nicht Heterostaliden) vollkommen an." Translated this is: However, according to the following description drafted at the place [of discovery] by the author and communicated in a letter, it belongs perfectly to the true Typhoniums, not to Heterostalis.

The binomial that followed this statement was also attributed to Mueller, and it was followed by a lengthy description in Latin. Schott then made a brief addition to this description, in German. The locality is given as: " Habit. in planitierum arundinetis ad flumen Victoriae (Arnhemsland) ".

The following year when Schott (1860) mentioned this species (again attributing the name to Mueller) he referred only to *Hooker's Journal of Botany*, and strangely failed to mention his own article in *Bonplandia*. Schott gave the locality as " Nova-Hollandia, Victoria-river, Arnhemsland ".

According to Recommendation 46D of the International Code of Botanical Nomenclature (1972), the citation of this species should be *Typhonium liliifolium* F.Muell. in Schott in *Bonplandia* **7** (8): 103 (1 May 1859).

Mueller had sent a specimen to Schott (1859 & 1860). According to Riedl (1965) Schott's Araceae were in Vienna but were destroyed in 1945. In the National Herbarium of Victoria there is one sheet which is probably a duplicate of the type. It bears the label " Typhonium liliifolium / ferd Mueller / Victoria River / Dec. 55, ferd. Mueller ". It is numbered MEL 503729.

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* National Herbarium of Victoria.

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Muelleria 3 (3): 208 (1976)

C. H. Rixon, Government Printer, Melbourne.